signal-to-noise ratios at the ends of the scan lines due to decreased light intensity on the object or media and through the optical system.

SUMMARY OF THE INVENTION

In accordance with an embodiment of the present invention, a method of treating a lamp tube having a first end and a second end comprising introducing a first quantity of a luminescent substance into the first end of the lamp tube and introducing a second quantity of a luminescent substance into the second end of the lamp tube is provided.

In accordance with another embodiment of the present invention, an illumination source comprising a linear tube having a first end and a second end and an inner surface having a luminescent substance distributed thereon, a longitudinal distribution of the luminescent substance having a minimum at a first point of the inner surface and a luminescent substance density greater than the minimum at each of a second and third point of the inner surface, the first point longitudinally located between the second and third points, is provided.

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention, the objects and advantages thereof, reference is now made to the following descriptions taken in connection with the accompanying drawings in which:

FIGURE 1 is a diagram representing an embodiment of a scan media document that may be scanned by an imaging system according to the present invention;

FIGURE 2 is a diagram illustrating illumination of a scan object contributed from a single point of an illumination source;

FIGURE 3 is a diagram illustrating the cumulative illumination of a midpoint of a scan object resulting from the entirety of the illumination source;

FIGURE 4 is a diagram illustrating the cumulative illumination of an endpoint of a scan object resulting from the entirety of the illumination source;

FIGUREs 5A-5B, respectively, illustrate a radiation profile and a lighting profile of an illumination source having a uniform luminescent substance distribution

and a radiation profile and a lighting profile of an illumination source having a typical luminescent substance distribution as is known in the prior art;

FIGUREs 6A-6D illustrate an embodiment of an illumination source according to the present invention, and exemplary luminescent substance density profiles resulting therefrom;

FIGURE 7 is a diagram illustrating a radiation profile and lighting profile of an imaging system according to the teachings of the present invention utilizing the illumination source described with reference to FIGURE 6; and

FIGUREs 8A-8J illustrate cross-sectional views of a lamp tube undergoing a treatment process for manufacturing the lamp tube with a non-linear luminescent distribution all according to an embodiment of the invention.

DETAILED DESCRIPTION OF THE DRAWINGS

The preferred embodiment of the present invention and its advantages are best understood by referring to FIGURES 1 through 8 of the drawings, like numerals being used for like and corresponding parts of the various drawings.

In FIGURE 1, there is illustrated a scan media, such as for example and not by way of limitation, a media 100 that may be scanned by an imaging system, for example a flatbed scanner, digital camera, copier, film scanner, or another device. The imaging system uses an illumination source, for example a linear cold cathode fluorescent lamp (CCFL) having phosphor, or another luminescent substance, excited by mercury molecules or another ultra-violet radiation source, to scan sequential scan line portions 10A-10N of media 100. Other types of lamps are commonly used in imaging devices, such as xenon lamps having phosphors excited by ultra-violet radiation from xenon molecules in the lamp tube. A scan line is illuminated with a CCFL with a plurality of focal points on each scan line. The totality of the light striking a particular focal point can be considered to originate from a finite number of point sources along the CCFL. The light that comes into focus on a focal point is generally passed through an image forming system, for example an image stabilizer, a filter, an optic system, a single lens, a holographic lens or another device. The light is then passed to a photodetector where it is converted to an electric charge. Generally, a plurality of electric charges are generated according to this technique for a given